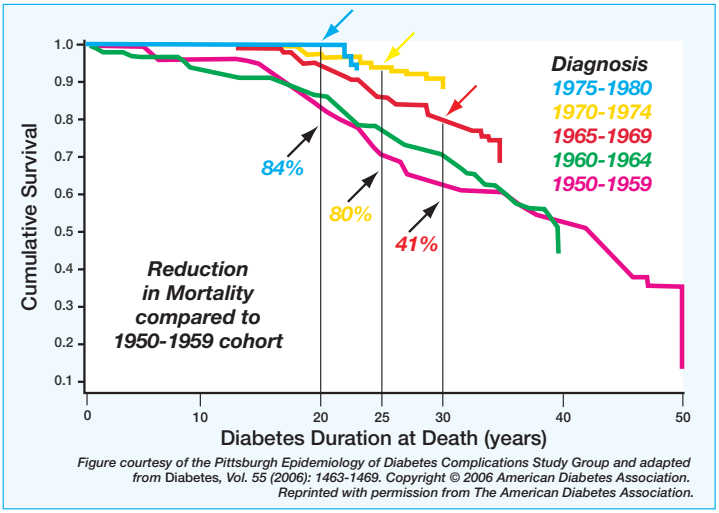
Special Statutory Funding Program for Type 1 Diabetes Research

www.T1Diabetes.nih.gov

Type 1 diabetes is a devastating illness that results when the immune system destroys the insulin-producing beta cells of the pancreas. Individuals with type 1 diabetes must check their blood glucose levels many times a day with finger sticks, carefully monitor their food intake and physical activity, and administer insulin with injections or a pump. Type 1 diabetes can cause life-threatening complications, such as heart disease, blindness, and kidney failure. Type 1 diabetes strikes children and young adults, heightening the lifetime risk of complications and years of life lost.* The *Special Statutory Funding Program for Type 1 Diabetes Research* is pushing forward the understanding, treatment, and prevention of type 1 diabetes and its complications. As scientists pursue a cure, meaningful progress and improved health have already been achieved.



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Type 1 diabetes patients are living longer, healthier lives: *Scientists examined the rates of premature death and complications 20–30 years after diagnosis with type 1 diabetes in western Pennsylvania. Mortality at 20 years after diagnosis was reduced by 84 percent for those diagnosed in 1975–80, compared to those diagnosed in 1950–59. The prognosis continues to improve, with kidney failure, diabetic nerve damage, and death all less likely to occur now than in the past, as research has led to continuous improvements in therapy.*

Reaping long-term benefits with well-controlled glucose levels: Scientists call it "metabolic memory." Not only is health improved during the period of good control, but well-controlled glucose levels also prevent or delay complications years down the road. Patients are now encouraged to achieve such control early and intensively.

Standardizing tests to monitor glucose control: Nationwide efforts by NIH and CDC to foster the intensive control of blood glucose proven to reduce complications utilize the "know your number" approach that has been effective in controlling cholesterol to reduce heart disease. A standardization program for the key measure of glycemic control supported by the *Special Funding Program* now covers 99 percent of U.S. laboratories offering the test.

Reducing diabetic kidney disease: The rate of end-stage renal disease in Caucasians under age 30 with diabetes (most of whom have type 1 diabetes) is almost half the rate seen in the late 1980s and early 1990s. Credit for the recent gains likely goes to implementation in clinical practice of strategies to prevent kidney disease, including improved management of diabetes.

Preventing birth defects in offspring: High blood glucose during the first trimester of pregnancy is associated with significant fetal loss and birth defects. Improved control of blood glucose prior to conception and early in pregnancy has substantially improved pregnancy outcomes for women with type 1 diabetes.

Using new technologies: Continuous glucose monitors can help patients achieve the close glucose control proven to reduce complications with less risk of dangerous low blood glucose reactions and fewer painful finger sticks. The next step is "closing the loop" by linking a continuous monitor to an insulin pump to further improve control and reduce the burden of constant balancing of food intake, physical activity, and insulin administration.

Catching the disease early: Predictive tests can define the 5- to 10-year risk of developing diabetes in relatives of people with type 1 diabetes. Early diagnosis in high-risk family members enrolled in screening studies has reduced hospitalization for life-threatening ketoacidosis and has helped preserve residual insulin production, improving control and lessening the risk of low blood glucose.

Moving therapies into the pipeline: Researchers are rapidly identifying promising new therapies in the lab, testing them in animal models, and readying them for clinical studies in patients. Studies looking for disease-causing genes and environmental triggers—which require many patients and years of follow-up—may lead to new prevention and treatment strategies.

Conducting clinical studies: National networks of medical centers are conducting clinical studies to prevent or reverse type 1 diabetes, develop islet transplantation as a cure, optimize use of new technology, and test new strategies to arrest complications. Multiple new therapies are currently being tested, and many more are in the pipeline.

Tracking diabetes in children: Data from Europe suggest that type 1 diabetes is occurring in more children and striking at an earlier age. For the first time, we know how many American children have diabetes. Continued collection of these data will show if numbers are changing over time and how new therapies will impact the course of disease.

Yielding far-reaching benefits: Type 1 diabetes has much in common with the other forms of diabetes and with over 80 other autoimmune disorders. As researchers learn to prevent or reverse the autoimmune destruction of beta cells and to block the tissue damage caused by high glucose, the knowledge gained will aid the more than 20 million Americans with diabetes, as well as the estimated 14.7–23.5 million Americans with autoimmune disease. Research in type 1 diabetes that established a measure of glucose control as a Food and Drug Administration-approved endpoint for clinical trials has led to approval of a wide range of new therapeutics for both type 1 and type 2 diabetes.

Coordinating efforts across NIH and HHS: This *Special Program*, led by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and vested in the Secretary of the Department of Health and Human Services (HHS), has catalyzed and synergized federal efforts to combat type 1 diabetes and its complications.

** American Indians and Alaska Natives have the highest prevalence of type 2 diabetes in the world. Diabetes has traditionally been a disease of older people. Alarmingly, diabetes is being diagnosed at young ages in Indian communities, which increases patients' risk of developing complications. A parallel funding program supports the prevention and treatment of diabetes in American Indians. Thus, the parallel special funding programs address two groups for which diabetes burden is particularly high.*